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I. GEOCAULON, A NEW GENUS OF THE SANTALACEAE

EVER since I first met *Comandra livida* Richardson, in 1894, I have had a strong conviction that it is out of place in the genus *Comandra* Nutt. Many times subsequently in the field, as I have gathered the juicy scarlet false-drupes from the filiform axillary peduncles or have examined the bronze or green, often unisexual, flowers, I have made a mental protest against the inclusion of this plant of the moss and damp humus in the same genus with *Comandra umbellata* (L.) Nutt. or with *C. elegans* (Rochel) Reichenb. f. Finally, in August, 1923, with the intention of settling the question, an abundant series of inflorescences was collected on the Shickshock Mountains; but not until the present time have they been closely studied. It now becomes quite clear that in essentially all its characters *C. livida* departs from all the species of *Comandra* proper: *C. umbellata* (L.) Nutt., *C. Richardsiana* Fernald, *C. pallida* A.DC., *C. elegans* (Rochel) Reichenb. f., *C. californica* Eastw., and perhaps others.

In true *Comandra* the stoutish creeping or sprawling superficial or subterranean stems or rootstocks are covered with a loose and freely exfoliating corky to papery whitish-brown cortex; in *C. livida* the very slender and cord-like reddish to dark-brown subterranean stems have a tight and smooth cortex. In true *Comandra* the inflorescences are terminal panicles or corymbs of numerous small umbels, each umbel subtended by a tardily deciduous or persistent foliaceous involucrel; in *C. livida* the 1-3 simple mostly 3-flowered umbels are borne on

filiform peduncles from the axils of the middle leaves, and the brown, scarious involucre are caducous. The flowers of true *Comandra* are perfect, the calyx-tube free from the summit of the ovary and in fruit slightly prolonged as a neck; and the ascending turbinate limb consists of petaloid whitish lobes. The flowers of *C. livida* are androdioecious, the central 1 (rarely 2) perfect, the lateral mostly staminate and promptly dropping after anthesis, or sometimes all the flowers staminate; the calyx-tube is completely adnate to the ovary, not prolonged above it, and the rotate limb consists of bronze or green herbaceous lobes. In true *Comandra* the elongate disk is shallowly lobed, its lobes much shorter than the filaments, and it reaches the summit of the prolonged tube; in *C. livida* the salverform disk arises from the base of the throat and its long lobes about equal the filaments. In true *Comandra* the style is filiform and prolonged; in *C. livida* conical and very short. Finally, the fruit of true *Comandra* is a dry nut with only the lower half or two-thirds of the coriaceous calyx-tube adherent to it, the upper portion forming a free neck below the erect lobes; in *C. livida* the fruit is a scarlet and juicy false-drupe, with the succulent calyx-tube completely surrounding the nut.

Differing in every fundamental character (of rootstock, flowering habit, involucre, fertility of flowers, shape and texture of perianth, adnation of tube, position and lobing of disk, form and length of style, and, above all, in the very different fruit), and restricted to the Hudsonian to arctic-alpine regions of North America, *Comandra livida* does not seem to be congeneric with the species of true *Comandra*, plants of more southern range in America, with an isolated species in southeastern Europe.

In many characters *Comandra livida* is much closer to the monotypic *Nestronia* (or *Darbya*) of the southeastern United States. Like staminate *Nestronia umbellula* Raf., *Comandra livida* has the simple few-flowered umbels on filiform axillary peduncles, borne always below the terminal leaves, the involucre bracts caducous (in all material of *Nestronia* examined completely absent), and the calyx herbaceous and with spreading limb. The pistillate or perfect flower of *Nestronia*, like that of *Comandra livida*, has the ovary quite inferior and ripening into a false-drupe with completely adnate calyx-tube. But in many characters *Comandra livida* departs from *Nestronia*. The latter is a branching shrub, with opposite leaves; *C. livida* at most suffruticose, with simple herbaceous flowering stems and

alternate leaves. *Nestronia* is dioecious or polygamo-dioecious, the pistillate flowers solitary (not umbellate) and with the limb a mere crown; *C. livida* with the perfect flower central in the umbel with the staminate and with a spreading limb. In *Nestronia* the calyx-lobes are normally 4, in *C. livida* 5; in *Nestronia* the calyx-tube of the staminate flower is elongate and lined by the elongate, shallowly lobed or undulate disk; in *C. livida* short-campanulate or salverform, with the lobes of the disk prolonged.

It is thus clear that in some of its technical characters *Comandra livida* is nearer *Nestronia* than it is to *Comandra*; yet it is not satisfactorily placed with either. It is, therefore, here proposed as

Geocaulon (*Santalaceae*), gen. nov. Flores andro-dioici, centrales plerumque hermaphroditi, laterales masculi. Calyces herbacei, priores et masculi inferne turbinato, feminei campanulati; lobis ovato-acutis, aeneis vel viridibus, patentibus persistentibusque. Fasciculus pilorum e basi interna lobi cujusve ad antheram tendens ubique adhaerens. Stamina lobis opposita, filamentis subulato, anthera ovoidea, biloculari. Discus epigynus hypocriteriformis, lobis elongatis filamenta subaequantibus. Ovarium inferum, tubo calycis inclusum. Stylus conicus, brevis. Stigma capitellatum. Drupa ovoideo-globosa coccinea, vestigiis loborum et disci coronata.—Fruticulus caulibus sarmentiformibus, valde repentibus, brunneis vel rufescentibus; ramis floriferis erectis; foliis alternis integris; umbella solitaria axillaris pedunculata 3 (2-4)-flora; bracteis involucri scariosis brunneis caducis; floribus masculis caducis. (Γῆ, *earth*, and κάυλος, *stalk*, from the long, slightly subterranean but scarcely modified stems.)—A single species.

G. lividum (Richardson), n. comb. *Comandra livida* Richardson in Frankl. Narr. 1st Journ. App. 734 (1823).—Creeping stems very slender, 1.5-3 mm. thick, with close smooth cortex; flowering stems 0.7-3 dm. high: leaves flaccid, grayish-green to purplish, elliptic to narrowly obovate, 1.5-5 cm. long: peduncles 1-3, filiform, in fruit 1-2 cm. long: limb of perianth about 4 mm. broad: drupes solitary (rarely 2), 6-10 mm. in diameter, with juicy pulp; the stone (or nut) thin-walled, with a very fleshy and oily edible kernel.—Creeping in moss or damp humus, Labrador to Alaska, south to southern New Brunswick, eastern Maine, mountains of northern New England, northern Michigan, northern Minnesota, Saskatchewan, Alberta and British Columbia. Fl. late May-early August; fr. July-September. The following, selected from many specimens, are characteristic. LABRADOR: Makkovik, *Stecker*, no. 99; Hopedale, *Bowdoin College Exped.* no. 245; Square Island, 1864, *B. P. Mann*; Chateau Bay, *Bowdoin College Exped.* no. 75; Forteau, *Fernald & Wiegand*, no. 3284. NEWFOUNDLAND: Burnt Cape, *Fernald, Wiegand, Pease, Long, Griscom, Gilbert & Hotchkiss*, no. 28,113; Mistaken Cove, *Wiegand, Pease, Long & Hotchkiss*, no. 28,112; Brig Bay, *Fernald, Long & Dunbar*,

no. 26,610; Deer Pond, *Wiegand, Gilbert & Hotchkiss*, no. 28,114; Port Saunders, *Fernald & Wiegand*, no. 3283; Bay of Islands, *Eames & Godfrey*, no. 6037; Sandy Lake, *Fernald & Wiegand*, no. 3282; Grand Falls, *Fernald, Wiegand, Bartram & Darlington*, nos. 5327, 5328; Tilt Cove, *Fernald & Wiegand*, no. 5331; St. John's, *Robinson & Schrenk*, no. 152. QUEBEC: Archipel du Petit Mécatina, *St. John*, no. 90,397; Ile à la Proie, Archipel de Mingan, *Victorin & Rolland*, nos. 18,506, 22,055; Baie Sainte-Claire, Anticosti, *Victorin*, no. 4270; Seven Islands, *C. B. Robinson*, no. 731; La Péninsule, Baie de Gaspé, *Victorin et al.* no. 17,331; Tabletop Mts., Gaspé Co., *Fernald, Dodge & Smith*, no. 25,713; New Carlisle, 1902, *Williams & Fernald*; Lac Saint-Jean, *Victorin*, no. 15,754; Tadousac, 1892, *Kennedy*; Rivière du Loup, *Victorin*, no. 134; St. Alexandre de Kamouraska, 1880, *Pringle*; Black Lake, *Fernald & Jackson*, no. 12,077. MAGDALEN ISLANDS: Brion Island, *St. John*, no. 1851. NEW BRUNSWICK: St. John, 1872, *T. P. James*. MAINE: Mt. Katahdin, 1900, *Fernald*; Mt. Saddleback, Franklin Co., 1894, *Fernald*, 1902, *Knowlton*; Mt. Abraham, *Knowlton*, no. 606; West Quoddy Head, Lubec, *Fernald*, no. 1715; Roque Bluffs, 1913, *Knowlton*. NEW HAMPSHIRE: Mt. Clinton, *Eggleston*, no. 2399, *Pease*, no. 12,303; Imp Mt., *Pease*, no. 16,766; Mt. Ingalls, *A. H. Moore*, no. 4096, *Pease*, no. 11,210. VERMONT: Mt. Mansfield, *Pringle et al.* ONTARIO: Pic River, *Loring*; Anvil Lake, Timagami Region, *Anderson & Anderson*, no. 26,100 B. MICHIGAN: Isle Royale, 1849, *Whitney*; Keweenaw Co., 1863, *Robbins*; Marquette Island, 1913, *W. H. Manning*. MINNESOTA: border of Lake of the Woods, south of 49°, *Richardson*. MANITOBA: Churchill, *J. M. Macoun*, no. 79,398; Lake Manitoba, 1881, *Macoun*. SASKATCHEWAN. 1857-8, *Bourgeau*. ALBERTA: Rocky Mts., *Drummond*; Banff, *Canby et al.* BRITISH COLUMBIA: Macleod's Lake, lat. 55°, *Macoun*, no. 1559; Revelstoke, *Shaw*, no. 31. YUKON: Dawson, *Eastwood*, nos. 117, 491. ALASKA: Lake Iliamna Region, *Gorman*, no. 174.

Geocaulon lividum was beautifully illustrated, as *Comandra livida*, in Hooker, *Flora Boreali-Americana*, t. clxxix B. Although the accompanying description indicates no difference between the central and lateral flowers, the artist noted the difference and showed the central perfect flower much larger than the others.

II. THE AMERICAN AND EASTERN ASIATIC BECKMANNIA

It has often been pointed out that the plant of northwestern North America and northeastern Asia which has passed as *Beckmannia erucaeformis* (L.) Host is not identical with the true *B. erucaeformis* (*Phalaris erucaeformis* L.) of southeastern Europe and southwestern Asia; but not until Hultén's recent scholarly publication upon the

flora of Kamtchatka¹ have the two plants been adequately contrasted. Hultén shows that there are two quite distinct species of *Beckmannia*.² True *B. erucaeformis* of Italy, Greece, Hungary, southern Russia and Asia Minor is a perennial with bulbous or "incrassated" bases, simple or but slightly compound and very short panicle-branches closely appressed to the rachis: spikelets mostly 2-flowered and strongly rounded; the glumes nearly semicircular, coriaceous and with a rounded keel and very narrow membranaceous border; the thick lemma short-mucronate or very short-pointed, scabrous and beset with long hairs along the median nerve. The plant of northeastern Asia and northwestern America, on the other hand, has the culms with soft bases, usually described as annual, commonly coarser and taller; the leaves broader; the panicle much more branched, with the principal branches longer and somewhat spreading; spikelets larger, mostly with 1 perfect and 1 aborted floret, pyriform; glumes rounded-triangular, broadest toward the apex, thin, strongly carinate, with a whitish scarious border; lemma thin, long-mucronate, glabrous or only slightly short-pilose on the dorsal nerve. For this plant of eastern Asia Hultén proposes the name *Beckmannia baicalensis* (W. Kuznetzow) Hultén,³ based upon *B. erucaeformis*, var. *baicalensis* W. Kuznetzow (1913).

Hultén gives a careful discussion of the two plants and makes a good case for the specific segregation of *B. baicalensis*; but, unfortunately, he overlooked at least two available names which were published earlier than Kuznetzow's in 1913. In order clearly to understand these names it is well to start with the original *Phalaris erucaeformis* L.⁴ Linnaeus did not differentiate the two and certainly included them both under *P. erucaeformis* which had its "*Habitat in Sibiria, Russia, Europa australi.*" After a brief original diagnosis, "PHALARIS panicula lineari secunda, calycibus bifloris," which certainly applies to the plant from "Russia, Europa australi," he gave three citations: "Dactylis spicis numerosis alternis culmo adpressis longitudine internodiorum, calycibus bifloris. *Roy. lugdb.*

¹ Eric Hultén, *Flora of Kamtchatka and the Adjacent Islands*, i,—Kungl. Svenska Vetenskapsakad. Handl. Ser. 3, v. no. 1 (1927).

² In some of our American manuals we are told that the genus was named "In honor of Johann Beckmann, . . . teacher of Natural History at St. Petersburg." The original statement of Host, however, was: "Hoc proprii generis gramen in honorem Cl. viri Joannis Beckmanni, in Universitate Goettingensi Oeconomiae ruralis Professoris, nominavi"—Host, *Ic. Gram. Austr.* iii. 6 (1805).

³ Hultén, l. c. 119 (1927).

⁴ L. Sp. Pl. i. 55 (1753).

57. *Gmel. sibir. I. p. 130. t. 29*" and "Gramen palustre, locustis erucaeformibus. *Barr. rar. 1158. t. 2.*" Royen's description and his citation of the description and plate of Barreliero show that he had the Italian plant and although Barreliero said of the plant "Annum est,"¹ he certainly had the plant of Italy, and the Linnean specific name was obviously derived from his *Gramen palustre, locustis Erucaeformibus*, a name given from the resemblance of the green spikes to caterpillars on the branches of a tree. Linnaeus's reference to Gmelin's Siberian plant alone belongs to *Beckmannia baicalensis*. Gmelin's plate is thoroughly typical for the latter species. With Linnaeus's own diagnosis and the plants of Royen and of Barreliero coinciding, and with the specific name clearly derived from Barreliero's account of the Italian plant, there can be no doubt that the name *B. erucaeformis* should be restricted to the plant of southeastern Europe and Asia Minor. The species is well illustrated in Host, *Ic. Gram. Austr. iii. t. 206* (1805); Nees, *Gen. i.t. 40* (1843) and Reichenbach, *Ic. Fl. Germ. i. t. clxxi* (1850).

That the wide-ranging northern plant is not identical with the Mediterranean species seems to have been first recognized by Steudel in 1846. Receiving the plant from Japan, Steudel, on account of the single perfect flower, the disarticulation of the spikelets below the glumes and the superficial resemblance of the plant to *Panicum brioides* Jacq. and others with the inflorescence of *Echinochloa*, described it as *Panicum Syzigachne*.² Later, however, recognizing that his Japanese species belonged to *Beckmannia*, he reduced it to a variety of *B. erucaeformis*, "Variat: statura et omnibus partibus majoribus. *Panicum Syzigachne. Steud. Flora 1846. p. 19. Japon.*"³ In 1880 Dr. George Thurber, treating the grasses of California and retaining our plant as *B. erucaeformis*, made the note: "In all American specimens we have thus far examined the upper floret is wanting."⁴ Thurber's observation was soon again emphasized by Vasey, who, in diagnosing *Beckmannia*, described the spikelets as "consisting of two perfect flowers, the terminal one only fertile, (or in American specimens the lower flower is suppressed);" and at the same time Vasey called the American plant *B. erucaeformis*, var. *uniflorus* Scribn.,⁵ but without diagnosis further than by implication from the

¹ *Barr. Plantae per Galliam, Hispaniam et Italiam Observatae*, 105 (1714).

² *Steud. Flora*, xxix. 19 (1846).

³ *Steud. Syn. Pl. Gram.* 15 (1854).

⁴ *Thurb. in Wats. Bot. Cal. ii. 264* (1880).

⁵ *Scribn. in Vasey, Descr. Cat. Grasses U. S. 8* (1885).

preceding note. In 1896 *B. erucaeformis uniflorus* Scribn. was used by Beal¹ for the American plant which was well described and illustrated by drawings of the spikelet supplied by Scribner; and in the 6th edition of Gray's *Manual*, Watson & Coulter took up *B. erucaeformis*, var. *uniflora*, a name dropped by Hitchcock from the 7th edition, where the plant is treated unequivocally as *B. erucaeformis*, although the genus, based upon a 2-flowered species, was by Hitchcock now defined as having "Spikelets 1-flowered in our species." In his later work the American and Asiatic plant is still maintained by Hitchcock as *B. erucaeformis* (without var. *uniflora* cited as a synonym); but the facts of the case are covered by the statement under the generic description: "Spikelets 1-flowered, rarely 2-flowered";² and under the specific description: "The European form has 2-flowered spikelets."² In 1913, W. Kuznetzow again named the Asiatic and American plant, his material coming from Transbaikalia, whence his new name *B. erucaeformis*, var. *baicalensis*,³ upon which Hultén based the specific combination *B. baicalensis*. In taking up Kuznetzow's varietal name as the specific name for a plant which extends half way around the northern hemisphere Hultén was apologetic: "Although his variety name is not very suitable for the species, I have thought it most correct to retain it" (p. 121). Unfortunately, however, correct following of nomenclatorial rules forces us to use for the species a name in some ways less desirable than *B. baicalensis*. The correct name of the plant seems to be

BECKMANNIA Syzigachne (Steud.), n. comb. *Panicum Syzigachne* Steud. *Flora*, xxix. 19 (1846). *B. erucaeformis*, var. Steud. *Syn. Pl. Gram.* 15 (1854). *B. erucaeformis*, var. *uniflorus* Scribn. in Vasey, *Descr. Cat. Grasses U. S.* 8 (1885), name only; in Beal, *Grasses N. A.* ii. 428, fig. 77 (1896). *B. erucaeformis*, var. *baicalensis* W. Kuznetzow, *Bull. Angev. Bot.* vi. No. 9: 584 (1913). *B. baicalensis* (W. Kuznetzow) Hultén, *Kunigl. Svenska Vetenskapsakad. Handl. Ser. 3*, v. no. 1: 119 (1927).

Beckmannia Syzigachne, as previously stated, was well illustrated by Gmelin. Scribner's figures of the spikelet of his *B. erucaeformis*, var. *uniflorus* are excellent, and Mrs. Chase's illustration (as *B. erucaeformis*) in Hitchcock, *Gen. Grasses U. S.* fig. 108 is very characteristic.

¹ Beal, *Grasses*, N. A. ii. 428, fig. 77 (1896).

² Hitchc. *Gen. Grasses U. S.* 180, 182 (1920).

³ W. Kuznetzow, *Bull. Angev. Bot.* vi. No. 9: 584 (1913).

III. THE EASTERN AMERICAN VARIETY OF *POLYSTICHUM*
BRAUNII

(Plate 159)

THE plant which has been passing in eastern America as *Polystichum Braunii* (Spenner) Fée abounds in rich woodlands and glades or on shaded talus and rock-slides of northern and western Newfoundland, Anticosti Island and the Gaspé Peninsula of Quebec. Westward and southward it becomes more local, extending west to Algoma District, Ontario and south (at low altitudes) to Cape Breton Island and Colchester and Kings Counties, Nova Scotia and Charlotte County, New Brunswick, and (chiefly in the mountains) to Aroostook, northern Penobscot, northern Piscataquis, northern Somerset and Franklin Counties, Maine, Carroll and Grafton Counties, New Hampshire, Berkshire County, Massachusetts, Ulster and Delaware Counties, New York, Sullivan County, Pennsylvania and Keweenaw County, Michigan. It is thus completely isolated from *P. Braunii* of Europe, which is there a plant of decidedly southern range: localized in upland woods of the Caucasus and southern Russia, and from the Transylvanian and Croatian Alps to the Maritime Alps and the Pyrenees, extending northward in the mountains to southern Germany, where (according to Milde) it is abundant in some regions of Silesia. North of southern Germany it is found at two stations in southernmost Sweden and at scattered stations in southern Norway, thence extending to a point (Brönnö) about midway along the western coast of Norway. It is not in arctic Europe, nor does it reach the British Isles, Iceland and Greenland; and the plant of eastern America does not extend north of the St. Lawrence basin, being decidedly a Canadian type. Outside Europe, *P. Braunii* is known in Eurasia only in northeastern Asia, whence it apparently extends across into southern Alaska. The Japanese plant is at least varietally distinct, var. *japonicum* Christ; and in Alaska there is a related plant, *P. alaskense* Maxon, which in its more attenuate pinnae and more tapering bases of the pinnules closely simulates the Kamtchatkan *P. Braunii*, var. *kamtschaticum* C. Chr. & Hultén, Kungl. Vet. Akad. Handl. v. no. 1: 38, t. 2 (1927), but its fronds are simply bipinnate, those of var. *kamtschaticum* tripinnatifid. European authors are in the habit of citing the Hawaiian Islands as also having *P. Braunii*, but the Hawaiian plants, *P. haleakalense* Brack. and *P. Hillebrandii* Carruth., are thoroughly distinct in many obvious characters. The Alaskan

material which may belong to *P. Braunii* is fragmentary and its identity, therefore, not readily settled, and at least some of the plants of eastern Asia are more like the eastern American than the European plant.

The plant of the Canadian forest of southeastern Canada and the northeastern states, unknown on the Labrador Peninsula or in Greenland, has obviously been long isolated from the European plant, unknown in arctic Europe, the British Isles and Iceland. As a general rule, flowering plants with such ranges would be found to have quite definite characters of flower and fruit and would stand as good species: such pairs as *Carex loliacea* L. (Eu., e. Asia and n.w. Am.) and *C. trisperma* Dew. (Atl. N.A.), *C. alba* Scop. (Eu., e. Asia) and *C. eburnea* Boott (Atl. N. A.), *Luzula pilosa* (L.) Willd. (Eu. and w. Asia) and *L. saltuensis* Fern. (Atl. N.A.), *Hepatica nobilis* Schreb. (Eu.) and *H. americana* (DC.) Ker. (Atl. N.A.), etc., etc.; but, although showing recognizable, though slight, differences in the scales of the stipe and rachis, in the texture of the frond and the tothing of the pinnules, the American and European plants have essentially identical spores.

P. Braunii of Europe is generally described as having herbaceous fronds: "Blätter . . . weich . . . nicht überwinternd"—Luerssen; "Textur krautig"—Christ; "*Frondes* . . . seulement *membraneuses*"—Rouy; but in the plant of eastern America they are subcoriaceous. Consequently, in the European plant the venation of the pinnules is distinctly seen under low magnification; in the American ordinarily it is rather obscure. The largest scales of the stipe-bases in the European plant are rather firm and are prolonged into bristle-tips 5–8 mm. long; in the eastern American they are much thinner and shorter-pointed (the bristle-tip 1–4 mm. long). Under considerable magnification the median cells of the large scales of the European plant appear elongate-linear, with heavy cell-walls and extremely narrow lumina; while in the eastern American plant the thinner scales show shorter-linear to oblong cells (mostly 100–300 μ long) with very thin walls and broad lumina, a difference similar to that separating the European *Thelypteris spinulosa*, var. *dilatata* (Hoffm.) St. John and the American var. *americana* (Fischer) Weatherby. In the European plant the back of the rachis (especially the lower half) bears innumerable retrorse soft acicular scales which are far more numerous than the lanceolate scales; in the eastern American plant the relation is

reversed, the lanceolate scales being more abundant than in the European, the acicular scales fewer and shorter. In the European plant the terminal (and often the marginal) bristles of the pinnules are 1–2 mm. long; in the plant of eastern America 0.5–1.3 mm. long. Only a few good indusia of the European plant have been available for study, consequently it has not been possible to make a satisfactory comparison of this organ in the two plants; but, as stated, the spores present no appreciable difference unless it is that the American are minutely larger.

With essentially identical spores and outline of frond, pinnae and pinnules, the two plants illustrate the conservatism of the ferns. They have obviously been long isolated but their segregation has proceeded only far enough to affect the superficial vegetative characters. These, however, are sufficient to make it clarifying to distinguish the eastern American (and northern Chinese) plant as a geographic variety; and since the first American record of the plant was based upon its discovery by Frederick Pursh in the Green Mountains of Vermont in 1807 it is appropriate that it be called

POLYSTICHUM BRAUNII (Spenner) Fée, var. **Purshii**, n. var., forma typica recedit frondibus subcoriaceis; stipitis squamis scariosis latissimis acutis vel breviter aristatis, arista 1–4 mm. longa, cellulis mediis oblongis vel linearibus 100–300 μ longis lumine lato parietibus tenuibus pallidis; rhacheos squamis lanceolatis fibrillosisque illis pluribus; pinnularum aristis terminalibus 0.5–1.3 mm. longis.—Cool woods, glades and shaded talus, northern and western Newfoundland, Anticosti Island and Gaspé Peninsula, Quebec to Algoma District, Ontario, south to Cape Breton and Colchester and Kings Counties, Nova Scotia, York and Charlotte Counties, New Brunswick, Aroostook, northern Penobscot, northern Piscataquis, northern Somerset and Franklin Counties, Maine, Carroll and Grafton Counties, New Hampshire, Berkshire County, Massachusetts, Ulster and Delaware Counties, New York, Sullivan County, Pennsylvania and Keweenaw County, Michigan; southward chiefly at altitudes from 300–1525 m. (1000–5000 feet); also northern China and Sachalin Island. TYPE: Smuggler's Notch, Vermont, August 9, 1877, *C. E. Faxon* (in Gray Herb.), distributed as *Aspidium aculeatum*, var. *Braunii*.

This is the plant which has regularly passed in eastern America as *Aspidium aculeatum*, *A. aculeatum*, var. *Braunii*, *Polystichum aculeatum*, var. *Braunii* and *Polystichum Braunii*.

EXPLANATION OF PLATE 159

POLYSTICHUM BRAUNII, var. *PURSHII*. A small plant, $\times \frac{1}{3}$, from Colebrook, New Hampshire, *Pease*, no. 10,387. Photograph by *Professor J. F. Collins*.

(To be continued)